Glossary

Recommissioning

air side systems
Equipment used to heat, cool, and transport air within building HVAC systems.

ASHRAE
American Society of Heating, Refrigerating, and Air-Conditioning Engineers, Inc.

balancing
Process of measuring and adjusting equipment to obtain desired flows. Applies to both air side and water side systems.

boiler
Pressure vessel designed to transfer heat (produced by combustion) or electric resistance to a fluid. In most boilers, the fluid is water in the form of liquid or steam.

British thermal unit (Btu)
A unit of energy equivalent to the amount of heat required to raise the temperature of 1 pound of water 1 degree Fahrenheit.

Btu
See *British thermal unit*.

calibration
Process of adjusting equipment to ensure that operation is within design parameters.

carbon monoxide
Colorless, odorless, poisonous gas formed during incomplete combustion of fuel.

central plant
Centrally located equipment that satisfies a building's cooling and heating loads.

CFCs
See *chlorofluorocarbons*.

cfm
Cubic feet per minute.

chiller
Mechanical device that generates cold liquid, which is circulated through cooling coils to cool the air supplied to a building.

chlorofluorocarbons
Chemical compounds consisting of carbon, hydrogen, chlorine, and fluorine, once used widely as aerosol propellants and refrigerants. Believed to deplete the atmospheric ozone layer.

coil, condenser
A heat exchanger used to condense refrigerant from a gas to a liquid.

coil, cooling
Heat exchanger used to cool air under forced convection with or without dehumidification. May consist of a single coil section or several coil sections assembled into a bank.

coil, fan
A device that combines a heat exchanger and a fan in a single unit that conditions air by forced convection.

coil, heating
Heat exchanger that heats air under forced convection. May consist of a single coil section or several coil sections assembled into a bank.

combustion air
Air that supplies the oxygen required to burn fuel.

commissioning
The quality assurance process that ensures design intent is met for new facilities or major rehabilitation.

condenser
Heat exchanger in a refrigeration system that expels building heat absorbed in the evaporator.

conditioned air
Air that serves a space and that has had its temperature and/or humidity altered to meet design specifications.

controls
An instrument or set of instructions for operating or regulating building systems.

control, pneumatic
A control that utilizes air pressure to vary equipment operation.

control, set back
The practice of reducing the thermostat setpoint during unoccupied times.

cooling tower
Device that dissipates heat from water-cooled systems through a combination of heat and mass transfer, whereby the water to be cooled is distributed in the tower and exposed to circulated ambient air.

cycling
The noncontinuous operation of equipment.

dampers
Single- or multiple-blade devices, either manually or automatically opened or closed, that control the flow of air.

demand charges
Fees levied by a utility company for electric demand.

demand, electric
Electrical power delivered to a system at a given time or averaged over a designated period. Expressed in kilowatts.

diffuser, HVAC
A device that distributes conditioned air to a space.

diffuser, lighting
A device that distributes light produced by lamps into a space.

efficiency
Ratio of power output to input.

EMS
See *energy management system.*

energy management system (EMS)
The control system that monitors the environment and energy usage in a building and alters equipment operation to conserve energy while providing occupant comfort.

envelope, building
The outer shell of a building, including walls, roof, windows, and doors.

evaporator
Heat exchanger in a refrigeration system that absorbs heat from chilled water or building air, thus reducing the supply temperature.

fouling
The buildup of a film that reduces heat transfer.

heat exchanger
A device that transfers heat from one fluid to another.

humidistat
A device that responds to humidity changes and controls equipment by seeking a setpoint.

HVAC
Heating, ventilating, and air-conditioning.

kilowatt (kW)
Unit of power equal to 1,000 watts.

kilowatt-hour (kWh)
Unit of electric consumption equal to the work done by 1 kilowatt acting for 1 hour.

kW
See *kilowatt*.

kWh
See *kilowatt-hour*.

load
The demand upon the operating resources of a system. In the case of energy loads in buildings, the word generally refers to heating, cooling, and electrical (or demand) loads.

maintenance
An ongoing process to ensure equipment operates at peak performance.

occupancy sensor
A device that detects heat (passive infrared) or a shift in the frequency of reflected ultrasonic sound waves, to control operation of lights or equipment accordingly.

off-peak
Refers to a utility rate schedule that designates the time of day when energy and demand costs are typically less expensive.

on-peak
Refers to a utility rate schedule that designates the time of day when energy and demand costs are typically more expensive.

packaged unit
A self-contained HVAC unit that provides heating and/or cooling to a building space.

part-load
Condition when equipment operates at less than full capacity to meet the demand placed upon it.

part-load performance
Equipment efficiency at less than full capacity.

pressure drop
The loss in pressure experienced by flowing water or air due to friction and obstructions.

radiator
Device that provides warmth to a space through radiant or convective heat provided by either steam or hot water.

recommissioning
Recommissioning ensures system functionality. It is an inclusive and systematic process intended not only to optimize how equipment and systems operate, but also to optimize how the *systems function together*.

refrigerant
Substance, such as *CFCs*, HCFCs, HFCs, air, ammonia, water, or carbon dioxide, used to provide cooling by evaporation and condensation.

reset, chilled water
The practice of increasing chilled water temperature to obtain higher chiller efficiency.

reset, condenser water
The practice of decreasing condenser water temperature to obtain higher chiller efficiency.

rooftop unit
Air-handling equipment such as *packaged units* located on the roof.

scaling
See *fouling*.

schedule
A control sequence that turns equipment on and off.

setpoint
Desired temperature, humidity, or pressure in a space, duct, etc.

shell, building
See *envelope, building*.

space
The distinct area to which conditioned air is delivered.

steam trap
A device that separates air and condensed water from steam.

TAB
See *testing, adjusting, and balancing*.

testing, adjusting, and balancing (TAB)
The process of adjusting HVAC system components to supply air and water flows at design or revised specifications.

thermostat
A device that responds to temperature changes and controls equipment by seeking a setpoint accordingly.

ton
Unit of cooling capacity equal to 12,000 Btu/hr.

tubes, condenser
Heat exchanger tubes through which condenser water is pumped to allow heat transfer between the condenser water and the refrigerant.

tubes, evaporator
Heat exchanger tubes through which chilled water is pumped to allow heat transfer between the chilled water and the refrigerant.

tune-up, building
The purposeful sequence of maintenance and operational improvements, undertaken at a specific point in time, designed to reduce energy use, heating loads, and cooling loads of existing facilities.

variable air volume (VAV)
A type of air-handling system that provides air at a constant temperature and varies the air quantity to each zone to match the variation in room load.

VAV
See *variable air volume*.

water side systems
Equipment used to heat, cool, and transport water to building HVAC systems.

Lighting

ballast
Power-regulating device that modifies input voltage and controls current to provide the electrical conditions necessary to start and operate gaseous discharge lamps.

carbon dioxide
Colorless, odorless, incombustible gas formed during respiration, combustion, and organic decomposition. Increasing amounts of carbon dioxide in the atmosphere are believed to contribute to the global warming phenomenon.

CERCLA
Comprehensive Environmental Response, Compensation and Liability Act (1980) an EPA regulation. Also known as the Superfund law.

color rendering index (CRI)
A measure ranging from 0 to 100 of the accuracy with which a light source renders different colors in comparison to natural light, which has a measure of 100.

controls
An instrument or set of instructions for operating or regulating building systems.

CRI
See *color rendering index*.

cycling
The noncontinuous operation of equipment.

deadband
A setting in the lighting control that provides a time delay, signaling the lights to switch off only if the light level is somewhat *above* the setting, or on only if the level is somewhat *below* the setting.

DEHP
Di (2-ethylhexyl) phthalate, an insulator used to replace PCBs in ballast capacitors starting in 1979. DEHP is listed as a hazardous waste in its pure form, but, according to *RCRA*, it is no longer considered hazardous once used in a lighting ballast.

demand charges
Fees levied by a utility company for electric demand.

demand, electric
Electrical power delivered to a system at a given time or averaged over a designated period. Expressed in kilowatts.

diffuser, HVAC
A device that distributes conditioned air to a space.

diffuser, lighting
A device that distributes light produced by lamps into a space.

efficacy
The ratio of lamp lumen output to total lamp power input expressed in lumens per watt.

efficiency
Ratio of power output to power input.

EMS
See *energy management system*.

energy management system (EMS)
The control system that monitors the environment and energy usage in a building and alters equipment operation to conserve energy while providing occupant comfort.

footcandle (fc)
Unit of illuminance equal to 1 lumen per square foot.

heat gain
The rate at which heat enters or is generated within a space at a given instant.

HID
High-intensity discharge.

HVAC
Heating, ventilating, and air-conditioning.

IAQ
Indoor air quality.

IES
Illuminating Engineering Society.

illuminance
Commonly called light level, the light intensity arriving on a surface measured in footcandles.

internal rate of return (IRR)
Compound interest rate at which the total discounted benefits equal total discounted costs for a particular investment.

IRR
See *internal rate of return*.

kilowatt (kW)
Unit of power equal to 1,000 watts.

kilowatt-hour (kWh)
Unit of electric consumption equal to the work done by 1 kilowatt acting for 1 hour.

kW
See *kilowatt*.

kWh
See *kilowatt-hour*.

load
The demand upon the operating resources of a system. In the case of energy loads in buildings, the word generally refers to heating, cooling, and electrical (or demand) loads.

lumen
Unit measurement of the rate at which a light source produces light per unit time.

luminaire
Complete lighting unit, consisting of one or more lamps together with a housing, the optical components to distribute the light from the lamps, and the electrical components (ballast, starters, etc.) necessary to operate the lamps.

luminance
Commonly referred to as brightness, the light leaving a surface measured in footlamberts. It considers both *illuminance* on the surface and reflectance of the surface.

luminance ratio
The ratio between the *luminances* of any two areas in the visual field. This is a measure of the uniformity of luminance.

maintenance
An ongoing process to ensure equipment operates at peak performance.

nitrogen oxides
Chemical compounds that contain nitrogen and oxygen. They react with volatile organic compounds in the presence of heat and sunlight to form ozone and are a major precursor to acid rain.

occupancy sensor
A device that detects heat (passive infrared) or a shift in the frequency of reflected ultrasonic sound waves, to control operation of lights or equipment accordingly.

packaged unit
A self-contained HVAC unit that provides heating and/or cooling to a building space.

payback
See *payback, simple*.

payback, simple
Also known as *payback*. Measurement of the elapsed time between an initial investment and the point at which accumulated savings are sufficient to offset the initial investment.

PCB
Polychlorinated biphenyl. A substance used as an insulator in the capacitor of fluorescent and HID magnetic ballasts prior to 1970. PCBs have been labeled as carcinogenic and can cause skin, liver, and reproductive disorders.

photocell
A device that responds electrically to the presence of light.

power factor
Ratio of real power to total apparent power.

power quality
The degree to which voltage and current wave forms conform to a sinusoidal shape and are in synchronous phase with one another. Poor power quality can have negative impacts on electrical equipment.

RCRA
Resource Conservation and Recovery Act, an EPA Regulation.

reflector
A device installed in *luminaires* used to direct light from a source via specular or diffuse reflection.

rightsizing
The process of correctly sizing equipment to the peak load.

rooftop unit
Air-handling equipment such as *packaged units* located on the roof.

schedule
A control sequence that turns equipment on and off.

sulfur dioxide
A heavy, colorless, pungent air pollutant formed primarily by the combustion of fossil fuels such as coal. It is a respiratory irritant and a precursor to the formation of acid rain.

VCP
See *visual comfort probability*.

visual comfort probability (VCP)
A rating given to lighting systems expressed as the percentage of people who will find light output acceptable in terms of glare due to direct light from luminaires.

voltage, volts
International system unit of electric potential or the amount of electrical flow, also referred to as electromotive force.

Supplemental Load Reductions

AHU
See *air-handling unit*.

air-handling unit (AHU)
Equipment used to distribute conditioned air to a space. Includes heating and cooling coils, fans, ducts, and filters.

air side systems
Equipment used to heat, cool, and transport air within building HVAC systems.

ASHRAE
American Society of Heating, Refrigerating, and Air-Conditioning Engineers, Inc.

balancing
Process of measuring and adjusting equipment to obtain desired flows. Applies to both air side and water side systems.

ballast
Power-regulating device that modifies input voltage and controls current to provide the electrical conditions necessary to start and operate gaseous discharge lamps.

British thermal unit (Btu)
A unit of energy equivalent to the amount of heat required to raise the temperature of 1 pound of water 1 degree Fahrenheit.

Btu
See *British thermal unit*.

calibration
Process of adjusting equipment to ensure that operation is within design parameters.

carbon dioxide
Colorless, odorless, incombustible gas formed during respiration, combustion, and organic decomposition. Increasing amounts of carbon dioxide in the atmosphere are believed to contribute to the global warming phenomenon.

CFCs
See *chlorofluorocarbons*.

cfm
Cubic feet per minute.

chiller
Mechanical device that generates cold liquid, which is circulated through cooling coils to cool the air supplied to a building.

chlorofluorocarbons
Chemical compounds consisting of carbon, hydrogen, chlorine, and fluorine, once used widely as aerosol propellants and refrigerants. Believed to cause depletion of the atmospheric ozone layer.

coil, condenser
A heat exchanger used to condense refrigerant from a gas to a liquid.

coil, cooling
Heat exchanger used to cool air under forced convection, with or without dehumidification. May consist of a single coil section or several coil sections assembled into a bank.

coil, fan
A device that combines a heat exchanger and a fan in a single unit that conditions air by forced convection.

coil, heating
Heat exchanger that heats air under forced convection. May consist of a single coil section or several coil sections assembled into a bank.

controls
An instrument or set of instructions for operating or regulating building systems.

dampers
Single- or multiple-blade devices, either manually or automatically opened or closed, that control the flow of air.

DEHP
Di (2-ethylhexyl) phthalate, an insulator used to replace PCBs in ballast capacitors starting in 1979. DEHP is listed as a hazardous waste in its pure form, but, according to RCRA, it is no longer considered hazardous once used in a lighting ballast.

demand charges
Fees levied by a utility company for electric demand.

demand, electric
Electrical power delivered to a system at a given time or averaged over a designated period. Expressed in kilowatts.

demand ventilation
Method of controlling the amount of outdoor air intake based on carbon dioxide levels in a space.

desiccant
A material that absorbs moisture from its surrounding environment.

domestic hot water
All hot water consumed in a building that is used for purposes other than heating a space.

efficacy
The ratio of lamp lumen output to total lamp power input expressed in lumens per watt.

efficiency
Ratio of power output to power input.

ENERGY STAR label
EPA's trademark symbolizing excellence in energy efficiency.

envelope, building
The outer shell of a building, including walls, roof, windows, and doors.

exhaust air
Air removed from a building and not reused.

glazing
Glass set or made to be set in frames.

glazing system
A configuration of materials with a transparent or translucent element designed to admit sunlight.

GPM
Gallons per minute. A measure of water flow rate.

heat exchanger
A device that transfers heat from one fluid to another.

heat, latent
The heat required to change the state of matter from a liquid to gas or gas to liquid.

heat pump
Heat pump utilize the vapor compression refrigeration cycle the same that a DX unit or chiller does. The difference is that a heat pump can reverse the direction of heat flow which naturally flows from warmer to cooler areas.

heat, sensible
The heat required to change temperature without changing state of matter. This temperature change can occur by exposure to radiation, friction between two objects, chemical reaction, or contact with a hotter object.

hp
Horsepower. A unit of mechanical power.

HVAC
Heating, ventilating, and air-conditioning.

IAQ
Indoor air quality.

infiltration
Air that leaks into a building through the building shell.

kilowatt (kW)
Unit of power equal to 1,000 watts.

kilowatt-hour (kWh)
Unit of electric consumption equal to the work done by 1 kilowatt acting for 1 hour.

kW
See *kilowatt*.

kWh
See *kilowatt-hour*.

load
The demand upon the operating resources of a system. In the case of energy loads in buildings, the word generally refers to heating, cooling, and electrical (or demand) loads.

maintenance
An ongoing process to ensure equipment operates at peak performance.

nitrogen oxides
Chemical compounds that contain nitrogen and oxygen. They react with volatile organic compounds in the presence of heat and sunlight to form ozone and are a major precursor to acid rain.

occupancy sensor
A device that detects heat (passive infrared) or a shift in the frequency of reflected ultrasonic sound waves, to control operation of lights or equipment accordingly.

payback
See *payback, simple*.

payback, simple
Also known as *payback*. Measurement of the elapsed time between an initial investment and the point at which accumulated savings are sufficient to offset the initial investment.

PPM
Parts per million. A unit of concentration.

roof curb
A raised and reinforced area on a roof for mounting equipment.

setpoint
Desired temperature, humidity, or pressure in a space, duct, etc.

shell, building
See *envelope, building*.

space
The distinct area to which conditioned air is delivered.

timeclock
The control device used to turn equipment on and off at set times of the day.

ton
Unit of cooling capacity equal to 12,000 Btu/hr.

transformer
A device that reduces the incoming line voltage, usually to a standard level, so that it may be used to operate electrical equipment in a building.

tune-up, building
The purposeful sequence of maintenance and operational improvements, undertaken at a specific point in time, designed to reduce energy use, heating loads, and cooling loads of existing facilities.

W/sf
Watts per square foot.

Fans

AHU
See *air-handling unit*.

air-handling unit (AHU)
Equipment used to distribute conditioned air to a space. Includes heating and cooling coils, fans, ducts, and filters.

air side systems
Equipment used to heat, cool, and transport air within building HVAC systems.

ASHRAE
American Society of Heating, Refrigerating, and Air-Conditioning Engineers, Inc.

balancing
Process of measuring and adjusting equipment to obtain desired flows. Applies to both air side and water side systems.

boiler
Pressure vessel designed to transfer heat produced by combustion or electric resistance to a fluid. In most boilers, the fluid is water in the form of liquid or steam.

British thermal unit (Btu)
A unit of energy equivalent to the amount of heat required to raise the temperature of 1 pound of water 1 degree Fahrenheit.

Btu
See *British thermal unit*.

CAV
See *constant volume*.

CFCs
See *chlorofluorocarbons*.

cfm
Cubic feet per minute.

chiller
Mechanical device that generates cold liquid, which is circulated through cooling coils to cool the air supplied to a building.

chlorofluorocarbons
Chemical compounds consisting of carbon, hydrogen, chlorine, and fluorine, once used widely as aerosol propellants and refrigerants. Believed to cause depletion of the atmospheric ozone layer.

coefficient of performance (COP)
A measure of efficiency in which a higher value designates a more efficient system.

coil, condenser
A heat exchanger used to condense refrigerant from a gas to a liquid.

coil, cooling
Heat exchanger used to cool air under forced convection, with or without dehumidification. May consist of a single coil section or several coil sections assembled into a bank.

coil, fan
A device that combines a heat exchanger and a fan in a single unit that conditions air by forced convection.

coil, heating
Heat exchanger that heats air under forced convection. May consist of a single coil section or several coil sections assembled into a bank.

condenser
Heat exchanger used to expel building heat absorbed in the evaporator of a refrigeration system.

conditioned air
Air that serves a space that has had its temperature and/or humidity altered to meet design specifications.

constant volume (CAV, constant air volume)
Type of air-handling system that supplies the conditioned space at a constant air flow and modulate heating and cooling by varying the air temperature.

controls
An instrument or set of instructions for operating or regulating building systems.

cooling tower
Device that dissipates heat from water-cooled systems through a combination of heat and mass transfer, whereby the water to be cooled is distributed in the tower and exposed to circulated ambient air.

COP
See *coefficient of performance*.

cycling
The noncontinuous operation of equipment.

demand charges
Fees levied by a utility company for electric demand.

demand, electric
Electrical power delivered to a system at a given time or averaged over a designated period. Expressed in kilowatts.

downsizing
Process of reducing the size (capacity) of equipment so that it operates efficiently at design load conditions.

ductwork
The distribution system for air in HVAC systems. It is usually made of sheet metal or fiberglass.

efficiency
Ratio of power output to power input.

EMS
See *energy management system*.

energy management system (EMS)
The control system that monitors the environment and energy usage in a building and alters equipment operation to conserve energy while providing occupant comfort.

evaporator
Heat exchanger in a refrigeration system that absorbs heat from chilled water or building air, thus reducing the supply temperature.

fouling
The buildup of a film that reduces heat transfer.

gasket
Material used to seal a joint against leakage.

GPM
Gallons per minute. A measure of water flow rate.

heat exchanger
A device that transfers heat from one fluid to another.

heat, latent
The heat required to change the state of matter from a liquid to gas or gas to liquid.

heat pump
Heat pump utilize the vapor compression refrigeration cycle the same that a DX unit or chiller does. The difference is that a heat pump can reverse the direction of heat flow which naturally flows from warmer to cooler areas.

heat, sensible
The heat required to change temperature without changing state of matter. This temperature change can occur by exposure to radiation, friction between two objects, chemical reaction, or contact with a hotter object.

hp
Horsepower. A unit of mechanical power.

HVAC
Heating, ventilating, and air-conditioning.

impeller
The rotating element of a fan or pump used to circulate the air or water.

internal rate of return (IRR)
Compound interest rate at which the total discounted benefits become equal to total discounted costs for a particular investment.

IRR
See *internal rate of return*.

kilowatt (kW)
Unit of power equal to 1,000 watts.

kilowatt-hour (kWh)
Unit of electric consumption equal to the work done by 1 kilowatt acting for 1 hour.

kW
See *kilowatt*.

kWh
See *kilowatt-hour*.

load
The demand upon the operating resources of a system. In the case of energy loads in buildings, the word generally refers to heating, cooling, and electrical (or demand) loads.

maintenance
An ongoing process to ensure equipment operates at peak performance.

meter
A device used to measure and display or record data.

nitrogen oxides
Chemical compounds that contain nitrogen and oxygen. They react with volatile organic compounds in the presence of heat and sunlight to form ozone and are a major precursor to acid rain.

off-peak
Refers to a utility rate schedule that designates the time of day when energy and demand costs are typically less expensive.

on-peak
Refers to a utility rate schedule that designates the time of day when energy and demand costs are typically more expensive.

packaged unit
A self-contained HVAC unit that provides heating and/or cooling to a building space.

part-load
Condition when equipment operates at less than full capacity to meet the demand placed upon it.

payback
See *payback, simple*.

payback, simple
Also known as *payback*. Measurement of the elapsed time between an initial investment and the point at which accumulated savings are sufficient to offset the initial investment.

power factor
Ratio of real power to total apparent power.

pressure drop
The loss in pressure experienced by flowing water or air due to friction and obstructions.

refrigerant
Substance, such as *CFCs*, HCFCs, HFCs, air, ammonia, water, or carbon dioxide, used to provide cooling by evaporation and condensation.

reset, chilled water
The practice of increasing chilled water temperature to obtain higher chiller efficiency.

reset, condenser water
The practice of decreasing condenser water temperature to obtain higher chiller efficiency.

rightsizing
The process of correctly sizing equipment to operate efficiently at design load conditions.

rooftop unit
Air-handling equipment such as *packaged units* located on the roof.

scaling
See *fouling*.

schedule
A control sequence that turns equipment on and off.

seasonal energy-efficiency ratio (SEER)
Cooling capacity (Btu/hr) divided by total input power (watts) requirement where both are seasonal averages.

SEER
See *seasonal energy-efficiency ratio*.

sheave
(Pronounced shiv.) Pulley.

space
The distinct area to which conditioned air is delivered.

thermostat
A device that responds to temperature changes and controls equipment by seeking a setpoint accordingly.

timeclock
The control device used to turn equipment on and off at set times of the day.

ton
Unit of cooling capacity equal to 12,000 Btu/hr.

tune-up, building
The purposeful sequence of maintenance and operational improvements, undertaken at a specific point in time, designed to reduce energy use, heating loads, and cooling loads of existing facilities.

variable air volume (VAV)
A type of air-handling system that provides air at a constant temperature and varies the air quantity to each zone to match the variation in room load.

VAV
See *variable air volume*.

VSD
See *variable-speed drive*.

variable-speed drive (VSD)
A device used to adjust the speed of an AC motor to match load requirements.

Heating and Cooling

AHU
See *air-handling unit*.

air-handling unit (AHU)
Equipment used to distribute conditioned air to a space. Includes heating and cooling coils, fans, ducts, and filters.

air side systems
Equipment used to heat, cool, and transport air within building HVAC systems.

ARI
Air-Conditioning and Refrigeration Institute.

ASHRAE
American Society of Heating, Refrigerating, and Air-Conditioning Engineers, Inc.

ASME
American Society of Mechanical Engineers.

boiler
Pressure vessel designed to transfer heat produced by combustion or electric resistance to a fluid. In most boilers, the fluid is usually water in the form of liquid or steam.

calibration
Process of adjusting equipment to ensure that operation is within design parameters.

carbon dioxide
Colorless, odorless, incombustible gas formed during respiration, combustion, and organic decomposition. Increasing amounts of carbon dioxide in the atmosphere are believed to contribute to the global warming phenomenon.

CAV
See *constant volume*.

CFCs
See *chlorofluorocarbons*.

chiller
Mechanical device that generates cold liquid, which is circulated through cooling coils to cool the air supplied to a building.

chlorofluorocarbons
Chemical compounds consisting of carbon, hydrogen, chlorine, and fluorine, once used widely as aerosol propellants and refrigerants. Believed to cause depletion of the atmospheric ozone layer.

coefficient of performance (COP)
A measure of efficiency in which a higher value designates a more efficient system. For example, Chiller efficiency measured in Btu output (cooling) divided by Btu input (electric power), measured at full or part load.

coil, condenser
A heat exchanger used to condense refrigerant from a gas to a liquid.

coil, cooling
Heat exchanger used to cool air under forced convection, with or without dehumidification. May consist of a single coil section or several coil sections assembled into a bank.

coil, heating
Heat exchanger that heats air under forced convection. May consist of a single coil section or several coil sections assembled into a bank.

condenser
Heat exchanger used to expel building heat absorbed in the evaporator of a refrigeration system.

constant volume (CAV, constant air volume).
Type of air-handling system that supplies the conditioned space at a constant air flow and modulate heating and cooling by varying the air temperature.

controls
An instrument or set of instructions for operating or regulating building systems.

cooling tower
Device that dissipates heat from water-cooled systems through a combination of heat and mass transfer, whereby the water to be cooled is distributed in the tower and exposed to circulated ambient air.

COP
See *coefficient of performance*.

dampers
Single- or multiple-blade devices, either manually or automatically opened or closed, that control the flow of air.

demand charges
Fees levied by a utility company for electric demand.

direct expansion system
Cooling system in which the refrigerant runs in the cooling coil to cool the air directly; that is, there is no water loop between the refrigerant and the air to be cooled.

downsizing
Process of reducing the size (capacity) of equipment so that it operates efficiently at design load conditions.

EER
Energy Efficiency Ratio. Cooling capacity (Btu/hr) divided by total input power (watts) requirement.

efficiency
Ratio of power output to power input.

EMS
See *energy management system*.

energy management system (EMS)
The control system that monitors the environment and energy usage in a building and alters equipment operation to conserve energy while providing occupant comfort.

fan, cooling tower
Fans that are used to draw air through the cooling tower to carry away water vapor.

gasket
Material used to seal a joint against leakage.

GPM
Gallons per minute. A measure of water flow rate.

heat-exchange area
Area where heat is transferred from one medium to another.

heat pump
Heat pump utilize the vapor compression refrigeration cycle the same that a DX unit or chiller does. The difference is that a heat pump can reverse the direction of heat flow which naturally flows from warmer to cooler areas.

HVAC
Heating, ventilating, and air-conditioning.

IEEE
Institute of Electrical and Electronic Engineers.

internal rate of return (IRR)
Compound interest rate at which the total discounted benefits become equal to total discounted costs for a particular investment.

IRR
See *internal rate of return*.

kilowatt (kW)
Unit of power equal to 1,000 watts.

kilowatt-hour (kWh)
Unit of electric consumption equal to the work done by one kilowatt acting for one hour.

kW
See *kilowatt*.

KWh
See *kilowatt-hour*.

load, cooling
Cooling (typically measured in Btu/hr or tons) required to maintain an indoor design temperature.

part-load conditions
Time when equipment is operating at less than design loads; represents the majority of the time equipment is operating.

payback
See *payback, simple*.

payback, simple
Also known as *payback*. Measurement of the elapsed time between an initial investment and the point at which accumulated savings are sufficient to offset the initial investment.

peak (cooling) load
Maximum cooling required to maintain an indoor design temperature under the most adverse summertime outdoor air conditions.

pump, chilled-water
Device that circulates chilled water.

pump, condenser-water
Device that circulates condenser water.

refrigerant
Substance, such as *CFCs*, HCFCs, HFCs, air, ammonia, water, or carbon dioxide, used to provide cooling by evaporation and condensation.

seasonal energy-efficiency ratio (SEER)
Cooling capacity (Btu/hr) divided by total input power (watts) requirement where both are seasonal averages.

SEER
See *seasonal energy-efficiency ratio*.

setpoint
Desired temperature, humidity, or pressure in a space, duct, etc.

space
The distinct area to which conditioned air is delivered.

strainer screen
Filtering device used in water side systems to protect equipment from dirt, rust, and other particles.

TAB
See *testing, adjusting, and balancing.*

ton
Unit of cooling capacity equal to 12,000 Btu/hr.

variable air volume (VAV)
A type of air-handling system that provides air at a constant temperature and varies the air quantity to each zone to match the variation in room load.

variable-speed drive (VSD)
A device used to adjust the speed of an AC motor to match load requirements.

VAV
See *variable air volume*.

VSD
See *variable speed drive*.

water side systems
Equipment used to supply heating and cooling for air side systems. Includes pumps, chillers, boilers, and other devices.